A STUDY OF MANAGEMENT OF LOWER GASTROINTESTINAL BLEEDING

Dissertation submitted in partial fulfillment of regulation for the award of M.S. Degree in General Surgery

(Branch I)

The Tamilnadu

Dr. M.G.R. Medical University

Chennai

March 2009

Coimbatore Medical College

Coimbatore - 641 014

CERTIFICATE

Certified that this is the bonafide dissertation done by **Dr.S.SREEDEVI** and submitted in partial fulfillment of the requirements for the Degree of M.S., General Surgery, Branch I of The Tamilnadu Dr. M.G.R. Medical University, Chennai.

Date: Unit Chief

Date: Professor & Head
Department of Surgery

Date: Dean
Coimbatore Medical College
Coimbatore - 641 014

DECLARATION

I solemnly declare that the dissertation titled **"A STUDY OF MANAGEMENT OF LOWER GASTROINTESTINAL BLEEDING"** was done by me from 2006 onwards under the guidance and supervision of Professor **Dr. N. JAYARAMACHANDRAN, M.S.**

This dissertation is submitted to the Tamilnadu Dr. MGR Medical University towards the partial fulfillment of the requirement for the award of MS Degree in General Surgery (Branch I).

Place: **Dr. S. SREEDEVI**

Date:

Coimbatore Medical College

COIMBATORE, TAMILNADU, INDIA - 641 014

(Affiliated to The T.N. Dr. MGR Medical University, Chennai)

ETHICS COMMITTEE

CERTIFICATE

Name of the Candidate	:	Dr. S. SREEDEVI
Course	:	M. S. (GENERAL SURGERY)
Period of Study	:	2006 - 2009
College	:	COIMBATORE MEDICAL COLLEGE
Dissertation Topic	:	A STUDY OF MANAGEMENT OF LOWER GI BLEEDING

The Ethics Committee, Coimbatore Medical College has decided to inform that your Dissertation is accepted / ~~Not accepted~~ and you are permitted / ~~Not Permitted~~ to proceed with the above Study.

Coimbatore - 14.

Date : 8.10.2007

Secretary
Ethics Committee

ACKNOWLEDGEMENT

I thank the lord, **almighty**, for giving me the strength to perform all my duties.

I wish to express my sincere thanks to our respected former Deans **Prof.Dr.T.P.Kalanithi,** M.D., and **Dr.Hemalatha Ganapathy,** M.D., and our present Dean **Prof Dr.V.Kumaran,** Mch.for permitting me to conduct this study in this hospital.

I acknowledge and express my gratitude and sincere thanks to our Professor and Head of the Department **Dr.R.Perumal Rajan,** M.S., FAIS**,** for his constant help and guidance throughout this study.

I owe a deep sense of gratitude and indebtedness to my teacher and guide **Prof.Dr.N.Jayaramachandran,** M.S., for his immense support, expert opinion, and encouragement during this study.

I also extend my gratitude and thanks to Professors **Dr.P.Govindaraj,** M.S**., Dr.A.Ramamoorthy,** M.S**., Dr.G.Mohan** M.S**, Dr.P.M.Nanjundappan,** M.S.,for the help rendered in conducting this study in their Units.

I also extend my sincere thanks to all **Assistant Professors**, of Surgical Department, with special thanks to **my Unit Assistant Professors**.

Last but not the least, I thank all **my patients** who subjected themselves for this study and made it successful.

CONTENTS

INTRODUCTION

Lower GI haemorrhage is an abnormal intraluminal bleeding from a source distal to the treitz ligament.

Despite the fact that bleeding per rectum is a common complaint in day to day practice, this study elaborates that every attempt should be made to diagnose the underlying cause of lower GI bleed and treat at an early stage.

During recent years, Colonoscopy has emerged as the diagnostic and therapeutic procedure of choice and should be performed in every case of lower GI bleed. Upper GI Endoscopy should also be preformed in a patient who presents with rectal bleeding, as upper GI haemorrhage may also be a cause of rectal bleeding.

AIM OF THIS STUDY

1. To study about the various causes of lower GI bleed.
2. To study about the various clinical presentations of lower GI bleed.
3. To emphasize the importance of colonoscopic evaluation as an initial investigating modality to find the cause of bleed.
4. To study about the various treatment modalities in the management of lower GI bleed.

REVIEW OF LITERATURE

Gastrointestinal bleed is classified based on the location relative to the ligament of Treitz, into **Upper GI bleed** and **lower GI bleed**.

Lower GI bleed is defined as an abnormal intraluminal bleeding, from a source distal to the ligament of Treitz. Usually presents with haematochezia (passage of maroon,or bright red blood or blood clots per rectum). Malena may also occur from a lower gastrointestinal blood loss associated with a prolonged gastrointestinal transit time.[3, 9, 10]

Lower GI bleeding is classified under 3 groups according to the amount of bleeding.[11]

Massive bleeding: usually present as haematochezia or bright red blood per rectum, in patients >60 years of age with multiple medical problems.Hemodynamicaly unstable. It is a life-threatening condition and will require blood transfusion and most commonly due to Diverticulosis and Angiodysplasias. Haemodynamic assessment and prompt resuscitation remains the main stay in the management of acute lower GI bleed. 80% of acute bleeding stops spontaneously.

Moderate bleeding: Usually present as haematochezia or malena, in patients with any age. Patients are hemodynamically stable. Most common cause is due to anorectal, inflammatory, congenital, neoplastic diseases.

Occult bleeding: Patients present with microcytic hypochromic anaemia due to chronic blood loss, in patients with any age. Most common cause is due to, inflammatory, congenital, neoplastic diseases causing chronic occult bleeding.[17, 22]

Acute massive rectal bleeding and malena often presents from upper GI pathology also, so to rule out upper GI hemorrhage, endoscopy is also preformed in a patent who presents with rectal blood loss.[33]

The normal amount of blood lost from the gastrointestinal tract ranges from 0.5 to 1.5ml per day and is typically not detected by fecal occult blood test. The colon is responsible for approximately 87 to 95 percent of all cases of lower gastrointestinal bleeding, with the remaining cases arising in the small bowel. Lower GI bleeding predominantly affects older populations with mean age of more than 55yrs[14].Men are affected significantly more than women. Etiology varies according to the age of the patient. [16,18,20,30]

Despite the improvement in diagnostic imaging and other procedures, 10-20% of patients with lower GI bleeding have no demonstrable bleeding source.[15]

Understanding of the pathogenesis, diagnosis, and treatment of lower GI Bleeding has drastically changed during the last 50 years. In the last 4 decades, diagnostic methods for locating the precise bleeding point have greatly improved.

In 1965, Baum et al described selective mesenteric angiography, which permitted the identification of vascular abnormalities and the precise bleeding point.

Rösch et al described superselective visceral arteriography for infusion of vasoconstrictors in 1971 and superselective embolization of the mesenteric vessels as an alternative technique to treat massive lower GI bleeding in 1972.[24]The initial experience with vasopressin infusion was reported in 1973-1974. .

The full-length colonoscope was developed in 1965. The first anal colonoscopy was performed in 1969. Endoscopic control of bleeding with thermal modalities or sclerosing agents has been in use since the 1980s. One of the advantages of upper (or lower) endoscopic evaluation is that it provides a means to administer therapy in patients with GI bleeding.

Nuclear scintigraphy has been used since the early 1980s as a very sensitive diagnostic tool to evaluate bleeding from GI tract. It can detect hemorrhage at rates as low as 0.1 ml/min.

Subtotal colectomy is the procedure of choice in patients who are actively bleeding from an unknown source.[31]

ANATOMY OF THE COLON [1, 2, 9]

The intestines are tubular organs that are placed in the abdominal cavity. The small Intestine, transverse colon, & sigmoid colon are mobile by virtue of attachment to the mesentery. These segments shift position freely, being limited only by their length, and the length of the mesenteric attachment.

The ascending and descending colon have no mesentery and are attached to the retroperitoneal wall; the type of attachment gives these segments a relatively fixed configuration.

The rectum differs from the aforementioned segments in that it passes through the pelvic connective tissue from the anus to the peritoneal reflection. Only a short segment of the proximal rectum is within the abdominal cavity.[1, 2]

Small intestine (Jejunum & Ileum): The average length of the part of the intestine is 6 m. The upper $2/5^{th}$ are jejunum; the lower $3/5^{th}$ are ileum. It is entirely surrounded by peritoneum. Small gut is suspended by its mesentry which extends from the left side of the 2^{nd} lumbar vertebra to the (Rt) iliac fossa,

Large bowel and anal canal: It is a muscular tube which extends from the end of the ileum to the anus, comprising the caecum and appendix, colon, rectum and anal canal. It is approx 140 cm long. (Fig-1)

Caecum: Blind sac in the right iliac fossa approx 5cm in length and width. The ileocaecal opening is guarded by the Ileocaecal valve. Its exact position is variable & may extend into true pelvis.

The ascending colon: - about 10 cm long, fixed posteriorly, ends at hepatic flexure where it turns left on the lower portion of right kidney. Usually retroperitoneal.

Transverse colon: - about 45-50cm long, extending from hepatic flexure to splenic flexure.

Descending colon: - about 15 cm long extends from splenic flexure to the sigmoid colon. It runs vertically up to the iliac crest then incline medially to reach pelvic brim, where it is continuous with the sigmoid colon.

Sigmoid colon: - forms a loop 20-60cm in length suspended by it mesocolon. This has an omega shaped attachment to the posterior abdominal wall. It extends from descending colon at the pelvic brim to commencement of rectum at S_3 level.

Rectum: - At the level of S_3 it proceeds downwards and forwards closely applied to the concavity of sacrum and coccyx, measuring 12-15 cm. It ends 2-3 cm in front and below the tip of coccyx. The relationship of pelvic peritoneum to rectum is of considerable surgical importance. The upper third is covered with peritoneum in front and on the sides, the

middle third covered only in front, lower third which is dilated to form ampulla, is devoid of peritoneum.

Anal Canal: - It is the terminal portion of the large intestine is about 4 cm long. It whole length is surrounded by sphincters which keeps it closed.

ARTERIAL SUPPLY OF LARGE BOWEL [1, 9] (FIG - 2)

1. **Superior mesenteric Artery :**

It gives of

- Ileo colic
- Right colic
- Middle colic that has a right and left branches. Left branch takes part in the arch of Riolan (Meandering artery), an important collateral channel anatomising with the inferior mesenteric artery.

Superior mesenteric Artery supplies the Jejunum, Ileum, Caecum, Ascending colon, Right 2/3rd transverse colon.

2. **Inferior mesenteric Artery:** It gives of

- Left Colic Artery
- Sigmoidal Arteries (3-4 in numbers)
- Superior Rectal Artery.

Inferior mesenteric Artery supplies the Left 1/3 of transverse colon, Descending colon, Sigmoid colon and, Rectum.

2. **Branches of internal iliac artery** - Middle rectal artery and Inferior rectal artery.

VENOUS DRAINAGE (Fig 3): It corresponds to the arteries. Veins from the right side of colon flow into superior mesenteric vein, which drains the midgut. This joins the splenic vein to form the portal vein. Veins from the left side of the colon flow in to the inferior mesenteric vein, which drains the hindgut and is the continuation of the superior rectal vein. It continues anterior to left renal vein to the left of duodeno-jejunal flexure and joins the splenic vein.[1, 2]

LYMPHATIC DRAINAGE: (Fig – 4)

Lymphatic of the large intestine accompany the vascular pedicle ultimately draining into four tiers of lymph nodes.

a. **Epicolic lymph nodes: -** along the gut wall.
b. **Para colic nodes,** on the medial side of ascending and descending colon and near the mesocolic border of the transverse and sigmoid colon.
c. **Intermediate nodes,** on the main branches of the vessels.
d. **Terminal nodes,** on the superior and inferior mesenteric vessels.[1, 2]

Nerve supply (Innervations) of Large Intestine

Nerve supply of large intestine, barring the lower half of the anal canal is both symphathetic (T_{11}, T_{12}, L_1, L_2) and parasymphathetic (Right vagus, S_2, S_3, S_4)

Symphathetic nerve is inhibitory to colon (ie, colonic peristalis and secretions) and motor to internal anal sphincter.

Parasymphathetic nerve is motor to large intestine and inhibitory to internal anal sphincter.

Pain impulses from the gut up to the descending colon travel through symphathetic nerve and from the sigmoid colon and rectum through the pelvic splanchnic nerves. [1, 2]

SURGICAL PHYSIOLOGY OF COLON AND RECTUM

The large intestine receives the ileal contents, absorbs water and electrolytes & acts as a reservoir for fecal matter until it is suitable to be discharged through the anus. It was calculated by Smidday et al (1960) that about 800-1000 ml of fluid enters the large intestine each day and 150ml of this is passed in the faeces. Complete loss of colonic and rectal function occurs during ileostomy and total proctocolectomy procedures. The discharge initially high slowly diminishes as the terminal ileum adopts taking over the absorptive function of the colon.

The importance of terminal 30cm of ileum was emphasized by Lillcher and Wangen stern(1956) urging conservation if possible.When ileocaecal valve is removed in right hemicolectomy bowel function is altered to produce an increased stool frequency i.e upto 4 times a day. This is due to colonic reflux with bacterial colonization of small bowel and loss of regulating valve. After left hemicolectomy only a slight increase in stool frequency occurs.[3, 4]

ETIOPATHOGENESIS

CAUSES OF LOWER GI BLEEDING:

I) BASED ON ETIOLOGY: [10]

1. Congenital
    - Polyps – Congenital polyp, Peutz jeghers syndrome, Familial polyposis coli
    - Meckel's diverticulum
    - Hereditary hemorrhagic telangectasia
2. Inflammatory
    - Tubercular ulcers in the small intestine
    - Enteric ulcers
    - Crohn's ileocolitis
    - Ulcerative colitis
    - Necrotizing enterocolitis
    - Dysentery - amoebic, bacillary, strongyloides infestation
3. Neopalstic
    - Papilloma of rectum
    - Carcinoma of colon and rectum
    - Leiomyoma of intestine
    - Lymphoma
    - Carcinoma of small bowel

- Diverticular disease

4. Vascular

- Angiodysplasia
- Ischemic colitis
- Vasculitis- polyarteritis nodosa
- Haemangioma

5. Clotting disorders

- Haemophilia
- Thrombocytopenia
- Leukemia
- Warfarin therapy
- DIC

6. Miscellaneous

- Haemorrhoids
- Prolapse rectum
- Fissure in ano
- Injury to rectum

II) BASED ON SITE OF BLEEDING: [9, 18]

1. Small intestine:

- Peutz jeghers polyps
- Meckel's diverticulum

- Tubercular ulcers
- Crohn’s ulcers
- Leiomyoma

2. Large bowel:

- Angiodysplasia of right colon and other vascular malformations
- Tumor - benign / malignant
- Ulcerative colitis
- Infectious colitis
- Antibiotic induced colitis
- Diverticular disease
- Ischemic colitis

3. Ano rectal condition:

- Haemorrhoids
- Rectal prolapse
- Fissure in ano
- Rectal injury
- Tumors – benign / malignant

HAEMORRHOIDS (Fig 5): They are dilated veins occurring in relation to the anus. They may be external or internal haemorrhoids. Arranged in three groups at 3, 7 and 11 o' clock position. External variety is covered

by skin, the, internal variety lies beneath the anal mucous membrane. Internal haemorrhoids are arranged in three groups at 3, 7 and 11 o' clock position.

Internal hemorrhoids are grouped into 4 degrees as follows:

- First degree- Bleeding, no prolapse.
- Second degree –Bleeding, Prolapse with spontaneous reduction.
- Third degree – Bleeding, Prolapse on straining and require manual digital reduction into the anal canal.
- Fourth degree – Prolapsed and cannot be reduced. Strangulated. [3, 5]

FISSURE IN ANO (Fig 6): The lesion is a longitudinal tear of squamous lined lower half of the anal canal from the anal verge towards the dentate line. Most fissures lie mid line posteriorly. Male=Female / 30-50 years. Etiology is unknown. Presents pain on defeacation, minor bright red bleeding, constipation,perianal pruritis. [3, 5]

INFECTIOUS COLITIS (Fig 7): The most common infectious causes of colitis are *Salmonella, Shigella, Campylobacter jejuni, Escherichia coli* and ***Entamoeba histolytica***. The pathophysiological mechanism may be due to either colonic tissue invasion by the bacteria or toxin-mediated damage.

POLYPS (Fig 8): Colonic polyps are abnormal elevations from epithelial surfaces & are usually asymptomatic, although those larger than 1 cm in diameter may bleed intermittently. Larger sessile polyps and cancers may cause overt or occult bleeding per rectum. Male > Female. [3]

HISTOLOGIC CLASSIFICATION OF POLYPS:

NONNEOPLASTIC POLYPS	**NEOPLASTIC POLYPS**
Hyperplastic (metaplastic)	Adenomatous polyp
Hamartomatous:	Tubular adenoma
• Juvenile	Tubulovillous adenoma
• Peutz-Jeghers	Villous adenoma
Postinflammatory	The Adenoma-to-Carcinoma sequence

POSTPOLYPECTOMY BLEEDING is more often arterial, and can produce significant bleeding.

COLORECTAL TUMORS (Fig 10): ***Precancerous conditions***: polyps like FAP, Villous adenoma, IBD.

Risk factors: smoking, alcohol, diet, genetic.

Male > Female. Mostly above 50 years of age.

Usually presents as bleeding per rectum, altered bowel habits, sense of incomplete evacuation, tenesmus, mass per abdomen,pain abdomen,loss of weight and appetite.

Carcinoma rectum accounts for nearly one third of all cancers, followed by Carcinoma sigmoid colon,caecum, and rectosigmoid junction-followed by others.98% of all the cancers of the large bowel are adeno-carcinomas. The other (rare) tumors of the large bowel are carcinoid, lymphomas and leiomyosarcoma.

Adenocarcinomas are classified as follows

1. Papilliferous
2. Ulcerative
3. Annular (circumferential)
4. Diffuse infiltrating
5. Colloid tumor

GRADING: Histological Grading I-IV according to degree of differentiation of cells.

MODIFIED DUKE'S CLASSIFICATION:

Stage A - Cancer is confined to the bowel wall.

Stage B - Cancer penetrates the bowel wall.

Stage C -Cancer indicates lymph node metastasis.

Stage D –tumors with distant metastasis.

Other pathological staging systems include the **TNM system.** [3, 5]

INFLAMMATORY BOWEL DISEASE (Fig 11, 12):

CROHN'S DISEASE AND ULCERATIVE COLITIS: Crohn's is a non specific inflammatory bowel disease, which involves the sub mucosa as well as the mucosa and is found any where in the alimentary canal from mouth to anus. Aphthous ulcers, deep longitudinal ulcers, Cobble stoning, skip lesions (abnormal areas intervening between normal mucosa), Non-caseating epitheloid granulomas, transmural involvement, pseudo polyps are path gnomonic of Crohn's colitis.

Ulcerative colitis primarily affects the mucosal layer and mostly involves rectum& sigmoid. Crypt abscesses, no `skip lesions' (continuous proximal spread from rectum), pseudo polyps, granularity and friability are path gnomonic of Ulcerative colitis.[4, 5]

INTUSSUSCEPTION: Invagination of one segment of intestine within (usually proximal into distal). It is the most common cause of intestinal obstruction in children (6-18 months).Ileocolic is the most common type. Causes in adults are Meckel's, hamartomous polyps, carcinoma, submucoasal lipoma. Presents with abdominal pain, bleeding per rectum, vomiting.[3, 5]

SOLITARY RECTAL ULCER: is a chronic recurrent ulcer on the anterior wall ulcer, caused by repeated mucosal trauma due to prolapse into the anal canal during straining and defecation.[4]

DIVERTICULOSIS: A diverticulum is a saclike protrusion of the colonic wall that develops at a small point of weakness where the penetrating vessel has perforated through the circular muscle fibers. Hemorrhage from diverticular disease stops spontaneously in 80% of patients.[20]

ANGIODYSPLASIA : tends to cause slow but repeated episodes of bleeding as it is venocapillary in origin.[28]

RADIATION-INDUCED COLITIS: Radiation therapy can cause inflammatory changes in the bowel resulting in mucosal bleeding. [27]

ISCHEMIC COLITIS: Ischemia causes mucosal and partial-thickness colonic wall sloughing, edema, and bleeding.

HISTORY AND CLINICAL EXAMINATION

1. Age of the patient

    a. Children and young boys – Polyps, Meckel's diverticulum, Necrotizing enterocolitis

    b. Young age groups – Haemorrhoids, Crohn's, dysentery

    c. Middle and old age - Carcinoma, Hemorrhoids, Prolapse, Diverticular disease

2. Colour of the blood

    - Bright red – Hemorrhoids, Fissure, Polyps
    - Altered blood – Carcinoma, Tubercular ulcers, Crohn's disease, Dysentery
    - Maroon color – Meckel's diverticulum.

3. Blood with mucus

    - Intussusception
    - Dysentery
    - Inflammatory bowel disease
    - Carcinoma

4. Other special features

    - Severe pain while bleeding / streak of blood – fissure in ano
    - Splash in the pan – Haemorrhoids

- Red current jelly stools – Intussusception
- Blood with cherry red mass coming out – Haemorrhoids, Polyps.

5. Palpable mass per abdomen
    - Hard mass in the colon- Carcinoma colon.
    - Firm to hard mass in the right iliac fossa – Ileo ceacal tuberculosis.
    - Contracting mass – Intussusception.
6. Rectal examination
    - Very painful – fissure in ano
    - Pedunculated mass – rectal polyp (juvenile polyp)
    - Ulceration in the rectum – solitary rectal ulcer
    - Indurated ulcer / cauliflower like growth – carcinoma rectum
7. Evidence of bleeding tendency
    - Purpuric spots
    - Haematoma

FLEXIBLE SIGMOIDOSCOPY & COLONOSCOPY

FLEXIBLE SIGMOIDOSCOPY: [35] (Fig 13)

Sigmoidoscopes are manufactured in different lengths; the two most popular are 35 cm and 60 cm. The rectum and a portion of the distal sigmoid colon can be visualized with the 35-cm flexible Sigmoidoscope. The 60-cm Sigmoidoscope allows for a more extensive examination, sometimes to the splenic flexure. . The procedure is an excellent adjunct to rectal examination and anoscopy in the investigation of symptoms referable to the anorectal area such as bleeding per rectum associated with pain, pruritis, and tenesmus. It can identify 50% of tumors. Biopsy of suspicious lesions can be taken. Bleeding hemorrhoids can be treated with endoscopic band ligation.[16]

COLONOSCOPY: [35] (Fig 14)

Instruments for routine examinations are available in four insertion tube lengths, approximately 180 cm, 140 cm, 100 cm, and 70 cm. Most currently available colonoscopies are about 13 mm in diameters. All modern colonoscopies have a four-way tip angulations system. The maximum up/down deflection of the instrument tip is usually 180 degrees. [29]

Colonoscopy after adequate bowel preparation, within 12 to 24hrs of admission, has been shown to be highly effective for the diagnosis and

therapeutic intervention of patients with LGI bleeding. Gut purge with a polyethylene glycol solution is used orally.

It is highly effective in identification of bleeding points and in detection of colorectal cancers. Colonoscopy allows visualization of mucosa of entire colon, rectum and usually up to the terminal ileum. It allows biopsy, polypectomy, haemorrhagic control, stricture dilatation.

Endoscopic hemostasis methods include injection therapy (epinephrine or saline), heat probe therapy, monopolar and multipolar electro coagulation, argon plasma coagulation, hemo clips and band ligation.[16, 35]

CONTRAINDICATIONS TO COLONOSCOPY:

Acute inflammation of the colon (fulminant), including ulcerative colitis, Crohn's colitis, ischemic colitis, diverticulitis, and radiation colitis

Peritonitis

Pregnancy (second and third trimester)

An uncooperative patient

Bleeding disorder

Acute cardio respiratory disease

Recent myocardial infarction

Pulmonary embolus

Shock

Large aortic or ileac aneurysm

Recent pelvic or colonic surgery

COMPLICATIONS AND HAZARDS OF COLONOSCOPY: Hemorrhage, Perforation, Post colonoscopy distention, Vasovagal reflex, Mucosal burns, Diastatic serosal tears.[16]

COLONOSCOPIC VIEW OF THE BOWEL:-[35] (FIG 15)

Endoscopically, the normal colorectal mucosa has a transparent, smooth, glistening surface that is uniformly salmon pink except where the colon is in contact with other organs such as the liver or spleen and it is devoid of villi.

The normal surface reflects the light of the endoscope. The average caliber of the colon is 7.5cm; the segment with greatest diameter is usually the caecum, followed by the ascending colon and rectum.

Sigmoid colon: - Muscular haustrations and multiple turns/bends after negotiating recto sigmoid.

Descending colon: - Tunnel-like after negotiating free sigmoid.

Splenic flexure: - Bluish tinge of the spleen and acute bend to the left.

Transverse colon: - Triangular shape due to attachment of the peritoneum.

Hepatic flexure: - Bluish indentation of the liver.

OTHER DIAGNOSTIC MODALITIES

Laboratory investigations

Urine routine

Complete haemogram

Liver function test

Stool examination for Occult blood, Fresh blood and for

Ova and cyst

Faecal occult blood test (Guaiac– based test): Faeces are smeared on a filter impregnated with guaiac acid. Hydrogen per oxide is added. The guaiac acid turns blue in the presence of haematin from haemoglobin. To be positive, fecal hemoglobin must exceed 10mg/ g of stool. [3]

Chest x ray

USG abdomen

Digital Rectal examination: Digit can reach approximately 8cm above dentate line. It is used to note the normal and the abnormal findings. Findings can be recorded as Intraluminal (e.g.blood,pus), intramural (e.g.tumors,granular areas, strictures) or extramural(e.g. enlarged prostrate, uterine fibroids). 20% of colorectal cancers can be diagnosed.[5]

Proctoscopy (Fig 16): It is used to inspect the anus,anorectal junction and lower rectum(up to 10 cm).biopsy can performed of any suspicious areas.

Haemorrhoids appears as Cherry red to pink mucosal bulges

Cancer rectum appears as bleeding ulcer or growth

Solitary ulcer rectum appears as single anterior ulcer.[3, 5]

Barium enema Contrast studies (Fig 17): It is a cheaper, less invasive and safer alternative to colonoscopy but only less sensitive at detecting colon cancer and polyps. Double contrast barium enema in conjunction with flexible Sigmoidoscopy will be a cost effective alternative of in patients who do not tolerate colonoscopy.

Trans rectal ultrasound: Is indicated in colorectal malignancy for anorectal cancer staging, anorectal lymph node evaluation

Angiography: It may be a useful diagnostic and therapeutic tool in patients who are actively bleeding. It is invasive. Selective mesenteric angiography is less sensitive and requires a higher bleeding rate (0.5ml/mt) to detect extravasations of blood into the gut. Angiographic localization of bleeding is accurate, Trans catheter intra-arterial infusion of vasopressin or super-selective arterial embolization with various agents (gelatin sponge, micro coils and polyvinyl alcohol particles) can be utilized to control bleeding if the site is identified.[3, 5]

Labeled RBC scan: Nuclear medicine Scintigraphy with Tc 99m – labeled red blood cells (RBC scans) or Technetium 99m – labeled sulfur colloid scan may detect bleeding in the GI tract with a bleeding rate as low as 0.1ml / mt . Advantage is easy to perform, requires no patient preparation and is non-invasive. [34]

Meckel's scan: Meckel's scan uses technetium pertechnetate trace because of the tracer's affinity to accumulate in gastric mucosa. The test is useful in pediatric population. [3]

Videocapsule endoscopy: The video capsule is delivered per orally to the small intestine by radiofrequency transmission. It has developed a niche in the evaluation if jejunoileal bleeding.[25]

Tumour markers: CEA Assay: It is a specific antigen in adenocarcinoma of the endodermally derived epithelium of the GIT. Preoperative testing is useful to determine cancer prognosis and to provide a baseline for comparison with post operative levels.

Biopsy: HPE of biopsy obtained preoperatively either by open or via colonoscopy is done to study the type grade of tumor and other characteristics.

MANAGEMENT

Emergency Medical Care in massive Lower GI bleed:

The management of acute massive lower gastrointestinal bleeding has 3 components, as follows:

- Resuscitation and initial assessment
- Localization of the bleeding site
- Therapeutic intervention to stop bleeding at the site

Upper GI haemorrage should be excluded.

Colonoscopy should be performed initially. Once the bleeding site is localized, therapeutic options include injection with vasoconstrictors (Vasopressin infusion**)** or **embolization** with agents such as gelatin sponge, coil springs, polyvinyl alcohol, and oxidized cellulose.

In patients in whom the bleeding site cannot be determined based on colonoscopy and in patients with active, brisk Lower GI bleed, angiography should be performed to locate the bleeding site.[21, 23]

Emergency Surgical Care in massive Lower GI bleed:

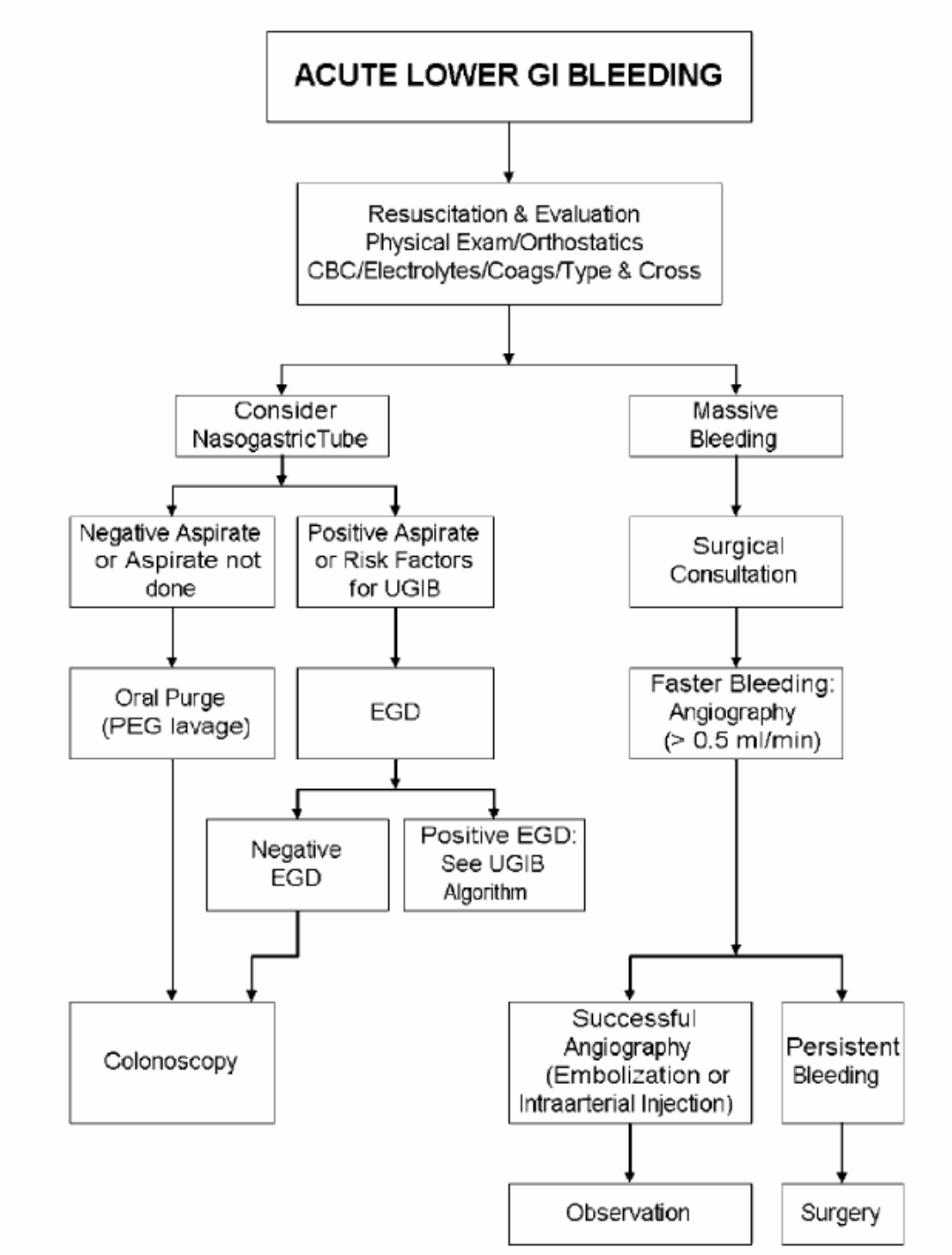
Emergency surgery is required in 10-25% of patients with lower gastrointestinal bleeding.

The indications for surgery include the following.[19, 32]

- Persistent hemodynamic instability with active bleeding
- Persistent, recurrent bleeding
- Transfusion of more than 4 units packed red bloods cells in a 24-hour period, with active or recurrent bleeding

In patients undergoing emergency laparotomy, every attempt should be made to localize the bleeding intraoperatively because a segmental colectomy is preferred. If the bleeding site is not localized, a subtotal colectomy is performed.[31]

MANAGEMENT PROTOCOL



MANAGEMENT OF DISEASE CAUSING LOWER GI BLEED

HAEMORRHOIDS: [5, 7]

Long-term management includes a high-fiber diet, stool softeners, and the avoidance of aspirin, NSAID, and anticoagulants.

Injection sclerotherapy: For I^O & II^O haemorrhoids - 5%phenol in almond oil is injected into sub mucosa above dentate line.

Rubber band ligation –for II^O & III^O haemorrhoids - Bands applied at the neck of haemorrhoid. (Fig19)

Milligan Morgan haemorhoidectomy (open): which involves dissection, transfixation & excision of the piles; preserving the intervening skin & leaving the wounds open

Hill-Ferguson haemorhoidectomy (closed): the above procedure, but cut mucosa& skin edges are sutured with absorbable catgut.

Stapled haemorhoidectomy: for prolapsing haemorrhoids.

Surgical haemorrhoidectomy is highly effective for the eradication of internal & external haemorrhoids-*Andrew S,Jackson et al*. [33]

ANAL FISSURE:

Conservative & medical therapy: More than 80% of acute anal fissures resolve without further therapy.

- Avoid constipation- stool-bulking agents, such as fiber supplementation and stool softeners- Laxatives, Mineral oil
- Sitz bath, provide significant symptomatic relief because they relieve some of the painful internal sphincter muscle spasm.
- Surface anaesthetics-lignocaine jelly
- Antibiotics.

Surgery:

Sphincter dilatation: This procedure is a controlled anal stretch or dilatation under general anesthesia.

Lateral anal sphincterotomy: This is the current surgical procedure of choice. It can be performed in either an open or a closed manner. Involves the division of the distal internal sphincter up to the dentate line, lateral to anal orifice, leaving the sphincter undisturbed.[5, 7]

INFLAMMATORY BOWEL DISEASE:

Medical management: [3, 5]

1. Anti-inflammatory medication: Oral 5-aminosalicylicacid preparation (mesalazine), sulfasalazine. They suppress disease activity and maintain remission
2. Steroids (eg. Prednisolone):Used to control exacerbation of wide spread colitis

3. Topical: 5- amino salicylic acid preparation and steroids are available in suppositories, enema and foam. They are useful in acute attacks of ulcerative colitis as it is often restricted to rectum
4. Metronidazole can be used

Symptomatic control:

1. Antidiarrhoeal agents (codeine phosphate, diphenoxylate preparations) used to control diarrhea
2. Replacement of nutrients, water and electrolytes

Surgical management:

Crohn's disease is a relapsing and recurrent and can affect entire length of the GI tract, so it cannot be cured by surgery

1. Stricture – stricturoplasty or resection
2. Ileocaecal resection
3. Colectomy and ileorectal anastomosis.

Ulcerative colitis:

Surgery is indicated in complication like toxic mega colon, active disease in spite of medical managements, steroid dependence, and hemorrhage.

1. Total proctocolectomy with ileostomy
2. Restorative proctocolectomy with ileal pouch.

COLORECTAL MALIGNANCY TREATMENT:

The various treatment modalities of colorectal carcinoma are [6, 8]

1. surgery radiotherapy
2. chemotherapy

Surgery (Fig 20, 21, 22, 23, 24, 25):

Surgical resection remains the mainstay of treatment. The objective of surgery is wide resection of the tumor together with regional lymphatic.

ANATOMICAL RESECTION OF COLONIC CANCER AT DIFFERENT SITES [3, 4]

Tumor location	Vascular ligation	Bowel resection
Caecum,Ascending colon	Ileocolic, right colic	Right hemicolectomy
Hepatic flexure, Proximal transverse colon	Ileocolic, right colic, Middle colic	Extended right hemicolectomy
Distal transverse colon Splenic flexure	Ileocolic, right colic, middle colic, left colic	Extended right hemicolectomy or left hemicolectomy
Decending colon	Inferior mesenteric or left colic	Left hemicolectomy
Sigmoid colon	Inferior mesenteric or sigmoid	Sigmoid resection
Upper 1/3rd rectum	Inferior mesenteric or haemorrhoidal	High anterior resection with colorectal anastomosis (sphincter saving surgery)
Middle 1/3rd rectum	Inferior mesenteric or haemorrhoidal	Low anterior resection (sphincter saving) or abdominoperineal resection
Lower 1/3rd rectum	Inferior mesenteric or haemorrhoidal	Abdominoperineal resection with permanent end colostomy (sphincter sparing surgery)

To get a tumor free margin, usually 5cm margin clearance is ideal and anastomosis may be end to end or end to side which should be tension free.

With the advent of staplers colonic tumors are able to be resected with successful anastomosis

Various other optional modalities for rectal carcinoma are

1. Transanal excision
2. Transanal endoscopic microsurgery
3. Coloanal anastomosis
4. Localized procedures like local excision, endocavitary irradiation

In obstructed emergency cases one should aim for primary relief of obstruction, followed by elective surgery if necessary.

Right sided obstructing tumors – managed by

1. 3 stage approach
    a. primary decompression
    b. resection of tumor at a later date
    c. closure of colostomy
2. Hartmann's procedure- primary resection with delayed anastomosis
3. Primary resection and anastomosis

Laparoscopic assisted methods are also used.

Chemotherapy:

All patients with Duke's stage 'C' colon cancer should be treated with 5-Furouracil & Leucovorin (immunomodulator) for 1year after surgery. This regimen reduces both recurrence and mortality.

Adjuvant therapy for colorectal cancers:

Radiotherapy is used for rectal cancers rather than colonic cancer. Radiotherapy reduces local recurrence but does not affect distant metastases or survival. Preoperative or post operative radiotherapy can be given.

Follow up for colorectal cancer: This aims to

1. Check post operative complications
2. Identify recurrence or metastatic disease
3. Detect metachronous tumors
4. Ensure that appropriate adjuvant therapy has been used.

Methods for identifying recurrence of metastatic disease:

1. Endoscopy – regular colonoscopy is recommended to detect recurrence of metachronous tumors
2. CEA – a tumor marker which can be used to predict recurrence
3. USG or CT Abdomen.

POLYPS: [5] are removed through excision by

1. Transanal excision
2. Endoscopic removal using diathermy snare (Fig 26)
3. Laparotomy for large adenomas.

DIVERTICULOSIS: Active bleeders are treated with epinephrine injection (1:10,000 or 1:20,000 in saline) using 0.5 or 1.0 mL aliquots around the bleeding point in the diverticulum. Subsequently, the bleeding vessel is cauterized with a multipolar probe or the vessel can be hemoclipped. [3]

MECKEL'S DIVERTICULUM: Incidently found Meckel's during laparotomy must be left lone, provided it has wide base.

Meckels with bleeding, with band, narrow mouth is treated by excision of divertculum with adjacent intestine.[5]

RADIATION COLITIS: Medical therapy with steroid, 5-amino-salysilic acid compounds, sucralfate. **Endoscopic therapy** with either laser or argon beam coagulation.

SOLITARY RECTAL ULCERS: Actively bleeding patients were treated by injecting epinephrine (1:10,000) circumferentially around the bleeding point. After injection, irrigation was used to expose the bleeding vessel, which was then cauterized with bipolar probe. Long-term management includes prevention of constipation and rectal prolapse with a high-fiber diet, stool softeners, and the use of gentle laxatives.[3]

INTUSSUSCEPTION: Any circulatory abnormalities are corrected by intravenous infusion, board spectrum antibiotic, nasogastric aspiration before operation.

- **Hydrostatic or pneumatic reduction**
- **Laparotomy** An attempt is made at manual reduction by retrograde milking of the intussusception. If this method is unsuccessful resection is limited to minimum consistent with safe control of blood supply and a satisfactory anastomosis.

  Laparoscopy in the management of intussusception was initially limited to a diagnostic role, but later therapeutic reduction of intussusceptions is done with laparoscopy.[6]

ISCHEMIC COLITIS: Most of these patients do not require any intervention, since bleeding, usually stop spontaneously.If a focal ulcer with stigmata of hemorrhage is found at colonoscopy, it can be treated endoscopically. Colonoscopy is the best method for making a definitive diagnosis.

Management of patients with ischemic colitis includes supportive care with intravenous fluid rehydration and blood transfusions and focal peritoneal findings on abdominal examination are indicative of bowel infarction and require urgent surgical intervention. [6, 7]

ANGIODYSPLASIAS are treated with thermal therapy, such as electrocoagulation or argon plasma coagulation.

POSTPOLYPECTOMY HEMORRHAGE: Brisk bleeding immediately after polypectomy usually arterial and can be controlled by resnaring the polyp stalk. Delayed bleeding is caused by sloughing of eschar and this usually occurs 1to2 weeks later. Delayed bleeding is self limited mostly, but persistent bleeding is treated with Endoscopic techniques (with epinephrine injection followed by thermal therapy, band ligation of remaining polyp stalk & haemoclips).

INFECTIOUS COLITIS often self limited. Treated with antibiotics. [5]

MATERIALS AND METHODS

This is a prospective study conducted at Coimbatore Medical College Hospital, Coimbatore during the period - 2006 to 2008.

The study group consisted of 75 cases of lower gastrointestinal bleed who attended the Surgical department with complaints of bleeding per rectum(i.e. with painless intermittent bleeding per rectum, acute massive bleeding per rectum, fresh blood mixed with stool, bleeding per rectum associated with altered bowel habits, mass abdomen, weight loss and anemia.) .

The study group included both male and female patients above 15 years of age.

These patients were evaluated by thorough history, clinical examination including digital examination of rectum, proctoscopy, laboratory investigations including complete haemogram, blood urea, sugar, creatinine, LFT, Blood grouping & typing, bleeding time & clotting time. Stool for ova, cysts, Skiagrams of chest, barium enema, Ultra- sonogram of abdomen, upper GI scopy & CT abdomen were taken where ever necessary.

All patients were subjected to colonoscopy. Those patients who were not willing for colonoscopy were excluded from the study.

The cause of lower GI bleed was diagnosed and managed accordingly.

RESULTS AND DISCUSSION

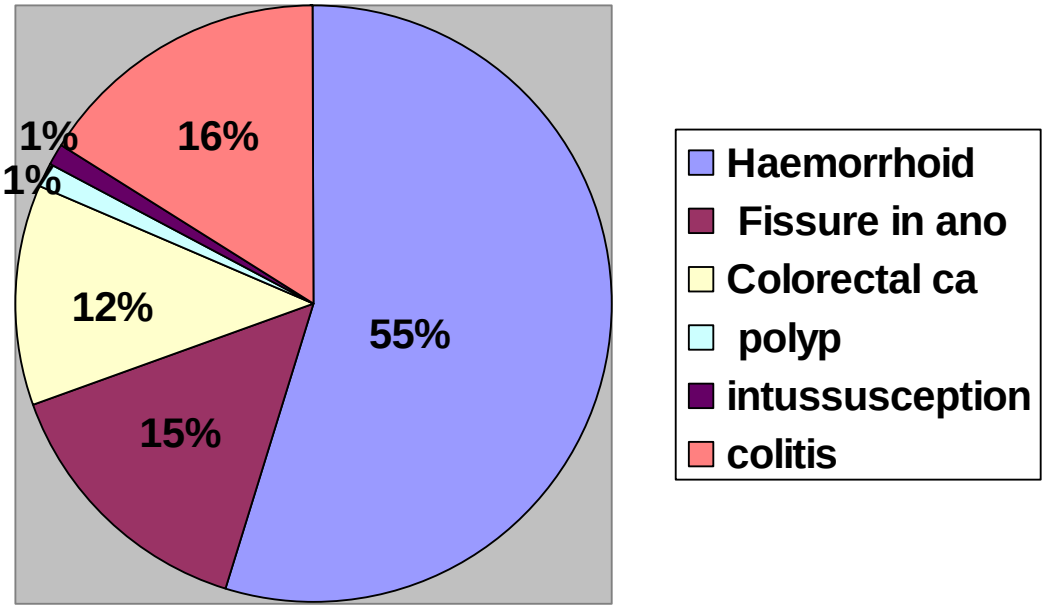
A total number of 75 cases with lower GI bleed who attended our institution and for whom colonoscopy was done were included in the study during the period from 2006 to 2008 and the following results were obtained.

DISEASE PREVALENCE OF LOWER GI BLEED:-

Description	No. of Cases	%
Haemorrhoids	**41**	**54.7**
Fissure in ano	**11**	**14.7**
Colorectal carcinoma	**8**	**10.7**
Rectal carcinoma with haemorrhoids	**1**	**1.3**
Amoebic colitis	**6**	**8**
Non specific colitis	**3**	**4**
Ulcerative Colitis	**2**	**2.7**
Intussusception	**1**	**1.3**
Polyps	**1**	**1.3**
Crohns	**1**	**1.3**
Total	**75**	**100**

The pie diagram shows the various etiological causes and distribution of lower GI bleed in this study.

DISEASE PREVALENCE IN THIS STUDY



Among the 75 patients, 41 patients found to have Haemorhoids (54.7%), 11 patients had Fissure in ano (14.7%), 9 patients had Colorectal carcinoma (11.9%), 6 patients had amoebic colitis (8%), 3 patients had nonspecific colitis (4%) and others Ulcerative colitis in two cases, and Intussusception and polyp one case each.

In this study, excluding Haemorrhoids and Fissure in ano, Colitis forms the most common etiology of lower GI bleed, next comes the Neoplasia of colon and rectum.

AGE INCIDENCE OF LOWER GI BLEED:

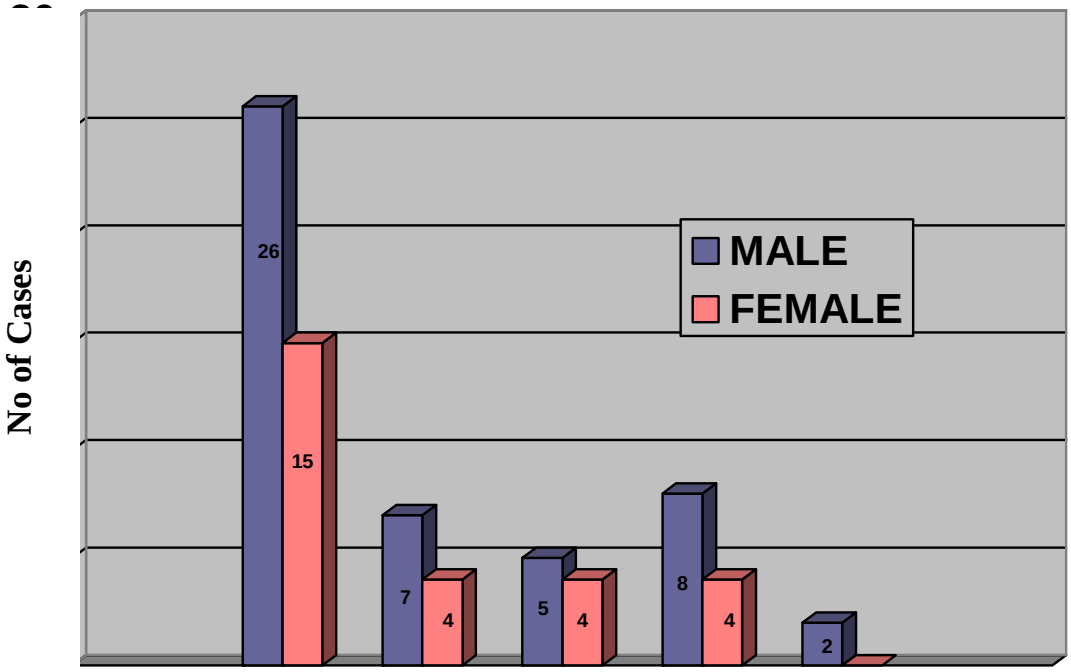
Age groups in years	No of cases	%
15-20	1	1.3
21-30	2	2.7
31-40	28	37.4
41-50	19	25.3
51-60	16	21.3
61-70	8	10.7
71-80	1	1.3
81-90	0	0
>90	0	0
Total	**75**	**100**

Although no age is exempted, majority of patients belongs to 30-60 years.

SEX INCIDENCE OF LOWER GI BLEED

Disease	Male	Female
Haemorrhoids	26	15
Fissure in ano	7	4
Colorectalcarcinoma	5	4
Amoebic colitis	4	2
Non Specific Colitis	2	1
Ulcerative Colitis	1	1
Intussusception	1	0
Crohns	1	0
Polyps	1	0
Total	**48**	**27**

The **Male: Female** ratio is (**1.78: 1**).



A- HAEMORRHOIDS

B- FISSURE IN ANO

C- COLORECTAL TUMORS

D- COLITIS

E- OTHERS

Bar diagram showing disease related sex incidence

In this study, in terms of diseases based on sex ratio, male population outnumbered females for Adenocarcinomas, Inflammatory bowel disease, Haemorrhoids,Fissure in ano and Amoebic colitis. Thus Lower GI bleed were more common in males when compared to the females, male: female ratio was (1.78: 1).

INCIDENCE OF HAEMORRHOIDS ACCORDING TO DEGREES

Degree of Haemorrhoids	No. of cases	%
I DEGREE	9	22
II DEGREE	6	14.6
III DEGREE	26	63.4
TOTAL	**41**	**100**

All patients with Haemorrhoids, presented with different degrees.of Haemorrhoids with complaints of painless bleeding per rectum, with or without constipation and perianal itching.

Out of 41 patients, 9 patients presented with first degree, 6 patients with second degree, and 26 patients with third degree haemorrhoids. Most of the patients presented with IIIrd degree haemorrhoids.

In this series of study haemorrhoids forms the most common cause of lower GI bleed.

COLORECTAL TUMOURS - SITE WISE INCIDENCE

Site of the tumors	No. of cases
Rectum	5
Sigmoid colon	2
Descending colon	1
Hepatic flexure growth	1
Total	**9**

In our study**,** out of the 9 patients with colorectal carcinomas , 5 patients were diagnosed as rectal carcinoma (out of the 5 patients with Rectal carcinoma, one patient had rectal carcinoma with haemorrhoids), 2 patients had Carcinoma sigmoid colon, & one patient each were diagnosed as Carcinoma Descending colon & Hepatic flexure..

All patients with colorectal carcinomas presented with complaints of passing bright- red bleeding per rectum, with or with out alteration in bowel habits, weight loss or abdominal pain, tenesmus.

Diagnostic Colonoscopy was performed for all cases and biopsy was taken in all the patients. Histologically our series of colorectal cancers were found to be Adenocarcinoma.

One patient with carcinoma sigmoid colon presented with obstruction and was taken up for emergency laparotomy.

Left sided colonic tumors were more common than the right.

Rectal carcinomas were the most common site of colonic tumors.

Out of the 9 patients with colorectal carcinoma, only 3 cases were diagnosed by digital rectal examination and other 6 cases were diagnosed by Colonoscopy only.

Out of the 9 cases of colorectal carcinoma one patient was diagnosed as rectal adenocarcinoma with haemorrhoids, which was diagnosed only by Colonoscopy and was surgically treated.

Thus this study emphasizes the importance of Colonoscopy which is used as a therapeutic interventional device for early diagnosis of colonic carcinomas.

USG and CT abdomen and contrast studies were done to stage the disease and to rule out other pathology.

VARIOUS TREATMENT MODALITIES FOR LOWER GI BLEED

Name of disease	No: of cases	Medical treatment	Surgery	Type of surgery& No: of cases
Haemorrhoids	41	11	30	Haemorrhoidectomy-26 Banding – 2 Sclerotherapy - 2
Fissure in ano	11	3	8	Lateral anal sphincterotomy (Open-5, closed-3).
Ca Rectum	5	-	5	APR-4, Hartman's-1
Ca Sigmoid	2	-	2	Anterior resection-1 Hartman's - 1
Ca descending colon	1	-	1	Left hemicolectomy-1
Ca hepatic flexure	1	-	1	Extended (Rt) Hemicolectomy - 1
Rectal Polyp	1	-	1	Polypectomy-1
Intussusception	1	-	1	Resection anastomosis-1
Colitis	12	12	-	-
TOTAL	**75**	**26**	**49**	

In this study, out of 75 patients, 49 patients underwent surgery, and the rest 26 patients were managed conservatively with symptomatic treatment.

Out of 41 patients with haemorrhoids, 26 patients underwent haemorrhoidectomy, (A patient with adenocarcinoma who presented along with haemorrhoids and underwent Abdominoperineal resection).2 patients with second degree haemorrhoids, underwent banding, and 2 patients with first degree haemorrhoids, underwent sclerotherapy & rest

11 patients in both first and second degrees were managed conservatively with symptomatic treatment.

Out of the 11 patients with chronic fissure in ano, 3 patients under went Closed lateral anal sphincterotomy, 5 patients underwent Open lateral anal sphincterotomy and the rest 3 patients were managed conservatively with symptomatic treatment.

Out of the 9 patients with Colorectal adenocarcinoma, 5 patients were diagnosed as rectal carcinoma, out of which 4 patients under went abdominoperineal resection with permanent end colostomy, 1 patient with rectal carcinoma were unresectable and were proceeded with Hartman's procedure and all the patients were followed up with adjuvant chemo radiation.2 cycles of chemotherapy followed by RT then followed by chemotherapy. Chemotherapy with injection 5-FU. .

Out of 2 patients with Carcinoma sigmoid colon, one underwent Anterior resection and the other patient who presented with intestinal obstruction, was taken up for emergency laparotomy and underwent Hartman's procedure and were followed up with adjuvant chemotherapy.

One patient with Adenocarcinoma descending colon underwent left hemicolectomy and one patient with Adenocarcinoma hepatic flexure underwent Extended right hemicolectomy and were followed up with adjuvant chemotherapy(with injection oxaliplatin &5-FU for 6 cycles).

. Thus all cases of colonic adenocarcinoma underwent surgical resection

of tumor or Hartman's procedure and were followed up with adjuvant chemotherapy or chemoradiation.

Thus this study emphasizes that, for colorectal carcinomas surgery (curative resection) remains the main modality of treatment**.** Chemotherapy and radiotherapy are only adjuvant therapies.

One patient diagnosed as rectal polyp underwent polypectomy and biopsy was proved as Juvenile retention polyp (non- neoplastic).

One patient who presented with history of bleeding per rectum and sub acute obstruction was diagnosed as ileocolic intussusception (due to polyp) and was taken up for laparotomy and underwent resection anastomosis.

Except for 1 patient who developed post operative wound infection, which was treated, all other patients had an uneventful post operative period.

Amoebic colitis was managed medically with antibiotics & amoebecides with Metronidazole & Diloxanide. Ulcerative colitis was managed with Oral 5-aminosalicylicacid, steroids & antibiotics. Out of 75 patients, 26 patients were managed with conservatively with medical treatment.

The bleeding was almost always minimal in all the cases and no hemodynamic instability occurred in any case.

All patients were followed up regularly up to 2008 with basic blood investigations, Ultrasound abdomen and Colonoscopy. There was no rebleeding.

CONCLUSION

1. In this study, the commonest cause of Lower GI bleed was Colitis, excluding Haemorrhoids and Fissure in ano.
2. Colorectal lesions forms the next common cause of lower GI bleed .There were no cases of small bowel lesions recorded.
3. The incidence of lower GI bleed was higher in males and most patients were in 30 – 50 years age group.
4. Carcinoma rectum was the most common colorectal malignancy. Out of 9 cases of colorectal malignancies, 6 were diagnosed by Colonoscopy, out of which one presented along with haemorrhoids. Colonoscopy is the diagnostic procedure of choice in patients presenting with Lower GI bleed. It was also used as a therapeutic device.

BIBLIOGRAPHY

1. Last RJ- Applied Anatomy, 10th edition, pg: 248-253,285-288.

2. Lee McGregor's Synopsis of Surgical Anatomy, 12th edition,pg: 31-71.

3. Text book of Surgery –Sabiston, vol II, pg: 1199-1221.

4. Schwartz's- Principles of Surgery, vol II,pg:1055-1117

5. Bailey & Love's-Short practice of Surgery, 24th edition, pg: 1153-1185, 1219-1252.

6. Maingot's- Abdominal opertions, vol I, 10th edition, pg: 289-311.

7. Farquharson's textbook of operative general surgery, 9th Edition pg: 391-429,439-443.

8. Mastery of Surgery- Josef.E.Fischer, 5th edition, pg: 1526-1556.

9. Bockus, 5th edition (Gastroenterology), Vol I, pg: 61-86.

10. Tadataka Yamada - Text book of Gastroenterology, vol I, 4th Edition, pg: 698-723,724-738.

11. Gastroenterology Clinics of North America-Gastrointestinal bleeding,Dec 2005, Vol -34, No:4, pg:643-750.

12. The management of Lower Gastrointestinal haemorrhage.,Dis Colon Rectum.2005,No 48(11):2010-24.

13. Lonstreth GF. Epidemiology and outcome of patients hospitalized with acute lower gastrointestinal hemorrhage: a population-based study. Am J Gastroenterol 1997; 92:419-424.

14. Boley SJ, Dibiase A, Brandt LJ, et al. Lower intestinal bleeding in the elderly. Am J Surg 1979; 137:57-64.

15. Jensen DM, Machicado GA. Colonoscopy for diagnosis and treatment of severe lower gastrointestinal bleeding: routine outcomes and cost analysis. Gastrointest Endosc Clin N Am 1997: 477-98.

16. Jensen DM, Machicado GA. Colonoscopy and hematochezia. In*:* Waye JD, Rex DK, Williams CB, Eds. Colonoscopy - Principles and Practice. London: Blackwell Sciences. 2000: 561-72

17. AGA guideline: Evaluation and management of occult and obscure Gastrointestinal bleeding. In: UpToDate, Rose, BD (Ed), UpToDate, Wellesley, MA, 2003.

18. Saab, S., Jutabha, R. Etiology of lower gastrointestinal bleeding. In: UpToDate, Rose, BD (Ed), UpToDate, Wellesley, MA, 2003.

19. Saab S., Jutabha, R. Approach to the patient with lower gastrointestinal bleeding. In: UpToDate, Rose, BD (Ed), UpToDate, Wellesley, MA, 2003.

20. Pemberton, J.H. Epidemiology and Pathophysiology of colonic diverticular disease. In: UpToDate, Rose, BD (Ed), UpToDate, Wellesley, MA, 2003.

21. Zucaro G Jr. Management of the adult patient with acute lower gastrointestinal bleeding.Am J Gastroenterol 1998; 93:1202-1208.

22. Rockey DC. Occult gastrointestinal bleeding. N Engl J Med 1999; 341:38-46.

23. Cathcart PM, Cathcart RS, Rambo WM. Management of massive lower gastrointestinal bleeding. Am Surg 1977; 43:217-219.

24. Rösch J, Dotter CT, Brown MJ. Selective arterial embolization. A new method for control of acute gastrointestinal bleeding. Radiology. Feb 1972; 102(2):303-6.

25. Lewis BS, Swain P. Capsule endoscopy in the evaluation of patients with suspected small intestinal bleeding: results of a pilot study. Gastrointest Endosc 2002; 56:349-353.

26. Silva RA, Correia AJ, Dias LM, Viana HL, Viana RL. Argon plasma coagulation therapy for hemorrhagic radiation proctosigmoiditis.

Gastrointest Endosc 1999; 50:221-224.

27. Babb RR. Radiation proctitis: a review. Am J Gastroenterol 1996; 91:1309-1311.

28. Bonis, P.A., Bynum, T.E. Angiodysplasia of the gastrointestinal tract. In: UpToDate, Rose, BD (Ed), UpToDate, Wellesley, MA, 2003.

29. Farmer KC, Church JM. Open sesame: Tips for traversing the anal canal. Dis Colon Rectum 1992; 35:1092-3.

30. Strate LL:Lower Gastrointestinal bleeding:Epidemiology and diagnosis. Gastroenterol Clin North Am 34:643-664, 2005.

31. Setya V,Singer JA, Minker SL:Subtotal colectomyas a last resort for unrelenting, unlocalised, lower GI haemorrhage.Am Surg 58:295-299, 1992.

32. Machicado Gustavo A, Jensen Dennis M.Endoscopic diagnosis and treatment of severe lower GI bleeding. Indian journal of Gastroenterology 2006; 25(7); 43-51.

33. Andrews BJ,Layer OT, Jackson BT,et al.Randamised trial comparing diathermy haemorrhoidectomy with scissor dissection Milligan Morgan operation.Dis Colon Rectum.1993;36:580-3.

34. Smith R,Copely DJ, Bolen FH.99m TC TBC Scintigraphic findings.Am J Roentgenol 1987; 148:869-74.

35. Peter B Cotton, Christopher B Williams.Practical Gastrointestinal Endoscopy. 5th edition; 82-196.

PROFORMA -I

A STUDY OF MANAGEMENT OF LOWER GI BLEEDING

Name: Age: Sex: IP No:

Occupation: social status: Address:

Presenting complaints:

Bleeding per rectum:
- Duration
- Frequency
- Frank blood
- Pain
- Quantity
- Blood in feaces
- Malena

Bowel habbits:
- Pain while defecation
- Constipation
- Loose stools
- Altered bowel habits
- Incomplete evacuation
- Mucus in stool

Pain abdomen:
- Site
- Duration
- Progression
- Aggravated by
- Relived by

Haematemesis:
Abdominal distension:
Palpable lump in abdomen:
Passage of flatus:
Mass descending per rectum:
Anorexia
Weight loss
Jaundice
Vomiting

Past history:

Abdominal surgery
H/o Radiotherapy to abdomen
Medical history:

Personal history:
Diet
Smoking
Alcoholism
Betal nut chewer:

Family history:
H/o familial polyposis coli
H/o GIT malignancy

Treatment history:

General examination:

Vitals:	PR	BP	RR
Pallor	Icterus	Clubbing	Pedal edema
Lymphadenopathy			

CVS:
RS:
CNS:

Examination of abdomen:
Visible mass
Visible intestinal peristalsis
Tenderness and localization
Palpable mass
Location
Plane of swelling
Size
Shape
Surface
Margin
Consistency
Movements with respiration

Hepatomegaly:
Ascitis:
Bowel sounds:
Per rectal examination:

Per vaginal examination:

Investigation:

HB
PCV
Blood grouping
LFT
BT / CT
Stool for occult blood
Xray
- Chest
- Abdomen AP plain
- Barium enema

USG abdomen

CT scan abdomen:

Sigmoidoscopy

Colonoscopy

Site of biopsy

Biopsy report

Provisional diagnosis:

Colonoscopic diagnosis:

Pathological diagnosis:

Treatment:

Follow –up:

PROFORMA II FOR COLONOSCOPY STUDY

Name : Age : Sex : Date :

Endoscopist Endoscopist Staff Provisional diagnosis :

Scope : Colonoscope :

Sigmoidoscope :

Provisional diagnosis :

Endoscopic diagnosis :

Procedure :

Emergency
Routine
Follow up
Therapeutic
Postoperative

Endoscopist

Assistant :
Staff

Colonoscopic picture taken Yes / No

Findings :

Specimen taken Yes / No

Brush cytology :
forceps biopsy :
Site of biopsy :
Pathology No :

Study : Complete / Incomplete
Normal / Abnormal
Next follow up needed / not needed

Advise : Medical
Surgical

Final diagnosis :
Site of lesion :

S. NO	NAME	AGE /SEX	IP No	SIGMODOSCOPY / COLONOSCOPY FINDING/ DIAGNOSIS	BIOPSY	TREATMENT
1	Selvam	38/M	16011	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
2	Rajendran	35/M	19447	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
3	Selvi	42/F	48860	Internal Haemorrhoids I^{O}	-	Medical
4	Muniraj	51/M	22122	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
5	Ramathal	33/F	23169	Fissure in ano	-	Open Lateral anal sphincterotomy
6	Gopal	36/M	50329	Fissure in ano	-	Open Lateral anal sphincterotomy
7	Munusamy	52/M	27882	Multiple inflamed areas	Non specific colitis	Medical
8	Deivanai	60/F	20631	Florid pancolitis,(inflamed,edematous multiple ulcers,pseudopolyps)	Ulcerative colitis	Medical
9	Maruthi	39/M	69789	Internal Haemorrhoids II^{O}	-	Rubber banding
10	Karpagam	45/F	34990	Proliferative circumferential growth at 6-8 cm from the anal verge	Rectal adenocarcinoma (mod differentiated)	Abdominoperineal resection followed by CT& RT
11	Rajeswari	34/F	30881	Friable & diffusely ulcerated mucosa with healthy mucosa in between ulcers	Amoebic colitis	Medical
12	Peter	61/M	22238	Internal Haemorrhoids II^{O}	-	Medical
13	Mohan	36/M	47876	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
14	Muruga	39/M	73845	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
15	Subramani	42/M	43193	Fissure in ano	-	Open Lateral anal sphincterotomy
16	Kavitha	48/M	54350	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
17	Arusamy	37/M	25334	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
18	Alagiri	22/M	72365	Ileocaecal intussusception with polyp	Inflammatory fibroid polyp	Resection & anastomosis
19	Chandrasekar	34/M	12390	Internal Haemorrhoids I^{O}	-	Medical
20	Natarajan	65/M	41368	Ulceroproliferative circumferential growth at Hepatic flexure	Adenocarcinoma (mod differentiated)	Extented (Rt) Hemicolectomy
21	Malliga	35/F	52167	Fissure in ano		Closed Lateral anal sphincterotomy

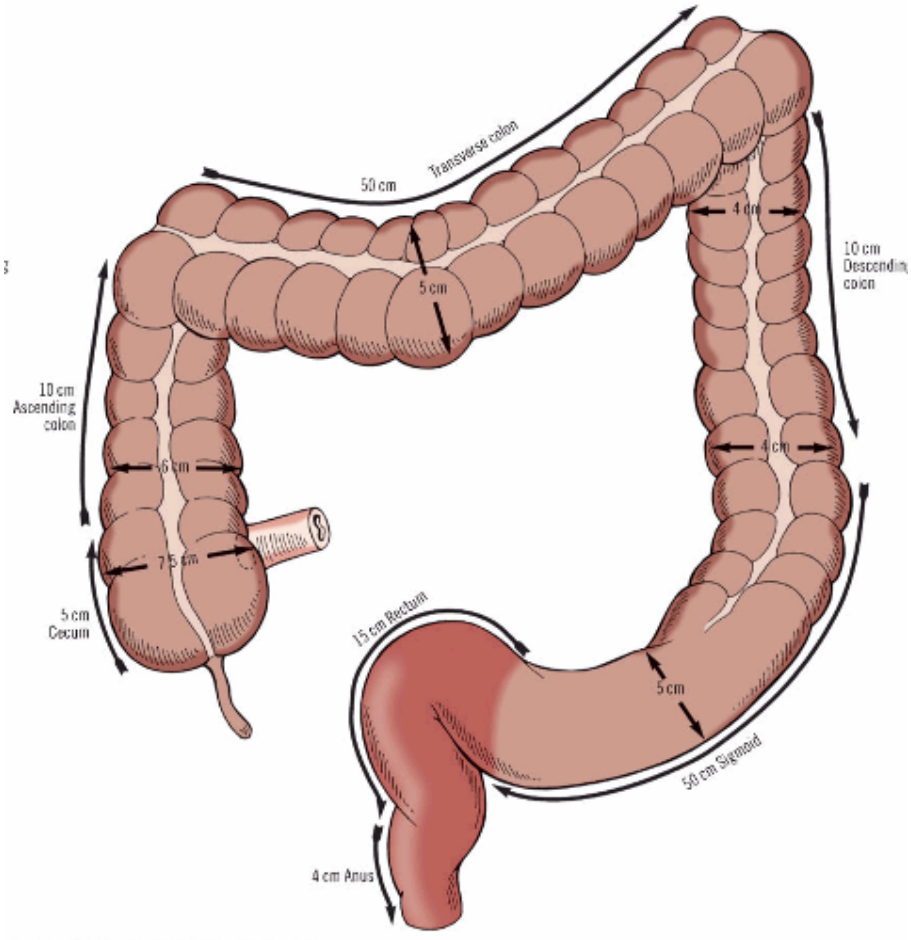
S. NO	NAME	AGE /SEX	IP No	SIGMODOSCOPY / COLONOSCOPY FINDING/ DIAGNOSIS	BIOPSY	TREATMENT
22	Senthil	52/M	50696	Friable & diffusely ulcerated mucosa with healthy mucosa in between ulcers	Amoebic colitis	Medical
23	Subbathal	60/F	20401	Ulcerated growth Descending colon	Adenocarcinoma (moderately differentiated)	(Lt) Hemicolectomy followed with CT
24	Chitra	34/F	52573	Internal Haemorrhoids I^{O}	-	Medical
25	Gopinath	34/M	28362	Internal Haemorrhoids II^{O}	-	Rubber banding
26	Srinivasan	60/M	12560	Entire colon loss of mucosal vascularity with multiple superficial ulceration & pseudopolyps	Ulcerative colitis	Medical
27	Vijay	32/M	6589	Internal Haemorrhoids I^{O}	-	Sclerotherapy
28	Velu	37/M	56195	Fissure in ano	-	Closed Lateral anal sphincterotomy
29	Rani	32/F	24301	Friable & diffusely ulcerated mucosa with healthy mucosa in between ulcers	Amoebic colitis	Medical
30	Ammu	38/F	12953	Multiple inflamed areas up to splenic flexure, ulcerated area seen at 35 cm	Non specific colitis	Medical
31	Selvi	40/F	47861	Proliferative friable stenosing growth at 7cm from anal verge	Rectal adenocarcinoma (well differentiated)	Hartman's procedure followed by CT/RT
32	Vadivel	68/M	49082	Internal Haemorrhoids II^{O}	-	Medical
33	Jothimani	38/F	42829	Fissure in ano	-	Closed Lateral anal sphincterotomy
34	Sundar	39/M	14478	Erythamatous & edematous ulcer over mucosa colon & normal vascular pedicle	Crohn's disease	Medical
35	Tamilselvi	33/F	71219	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
36	Jeyakumar	45/M	23880	Fissure in ano	-	Medical
37	Velmurugan	37/M	33982	Diffusely inflamed ulcerated mucosa	Amoebic colitis	Medical
38	Ravichandran	42/M	24496	Multiple superficial patches	Non specific colitis	Medical
39	Balu	17/M	35002	Rectal polyp	Retention polyp(juvenile)	Polypectomy

S. NO	NAME	AGE /SEX	IP No	SIGMODOSCOPY / COLONOSCOPY FINDING/ DIAGNOSIS	BIOPSY	TREATMENT
40	Natarajan	65/M	41368	Ulceroproliferative circumferential growth at hepatic flexure	Adenocarcinoma (moderately differentiated)	Extended (Rt) Hemicolectomy followed with CT
41	Poongodi	48/F	57288	Fissure in ano	-	Open Lateral anal sphincterotomy
42	Joseph	44/M	14478	Friable & diffusely ulcerated mucosa with healthy mucosa in between ulcers	Amoebic colitis	Medical
43	Kumar	56/M	58086	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
44	Krishnamurthy	42/M	72363	Internal Haemorrhoids II^{O}	-	Medical
45	Radha	49/F	42148	Internal Haemorrhoids I^{O}	-	Medical
46	Rajeswari	34/F	6194	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
47	Venkatasamy	60/M	32756	Proliferative circumferential growth at 10 cm from the anal verge with haemorrhoids	Rectal Adenocarcinoma (mod differentiated)	Abdominoperineal resection followed by CT& RT
48	Mani	51/M	54342	Fissure in ano	-	Medical
49	Subbu	42/M	29091	Diffusely inflamed, ulcerated mucosa	Amoebic colitis	Medical
50	Kalidas	41/M	41292	Internal Haemorrhoids I^{O}	-	Medical
51	Saraswathy	46/F	16011	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
52	Kanakaraj	43/M	67044	Fissure in ano	-	Medical
53	Rajkumar	35/M	15500	Internal Haemorrhoids I^{O}	-	Medical
54	Marudachalam	58/M	46841	Proliferative, friable growth at 20cm from anal verge	Sigmoid Adenocarcinoma (mod differentiated)	Anterior resection followed by CT
55	Devi	34/F	45538	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
56	Moorthy	29/M	42259	Fissure in ano	-	Medical
57	Lakshmi	61/F	25828	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
58	Senthil	63/M	2251	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
59	Thulasimani	46/F	33257	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy

S. NO	NAME	AGE /SEX	IP No	SIGMODOSCOPY / COLONOSCOPY FINDING/ DIAGNOSIS	BIOPSY	TREATMENT
60	Mangalam	71/F	23824	Proliferative circumferential growth at 10 cm from the anal verge	Rectal Adenocarcinoma (mod differentiated)	Abdominoperineal resection followed by CT& RT
61	Shanthi	62/F	51516	Internal Haemorrhoids II^{O}	-	Medical
62	Balakrishnan	43/M	51088	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
63	Palani	52/M	53185	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
64	Kaliammal	32/F	4206	Internal Haemorrhoids I^{O}	-	Medical
65	Nagalakshmi	50/F	42247	Proliferative friable, stenosing growth from 15-25 cm from anal varge.	Sigmoid - Adenocarcinoma (mod differentiated)	Hartman's procedure followed by CT
66	Kittammal	37/F	55139	Internal Haemorrhoids I^{O}	-	Medical
67	Srinivasan	62/M	22529	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
68	Saradha	42/F	23470	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
69	Saroja	54/F	14235	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
70	Velan	36/M	25480	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
71	Edumban	59/M	26741	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
72	Alexander	39/M	37435	Proliferative circumferential growth at 6-8 cm from the anal verge	Rectal Adenocarcinoma (mod differentiated)	Abdominoperineal resection by followed by CT& RT
73	Raman	33/M	28059	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
74	Abdul	47/M	53152	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy
75	Raja	32/M	41009	Internal Haemorrhoids III^{O}	-	Haemorrhoidectomy

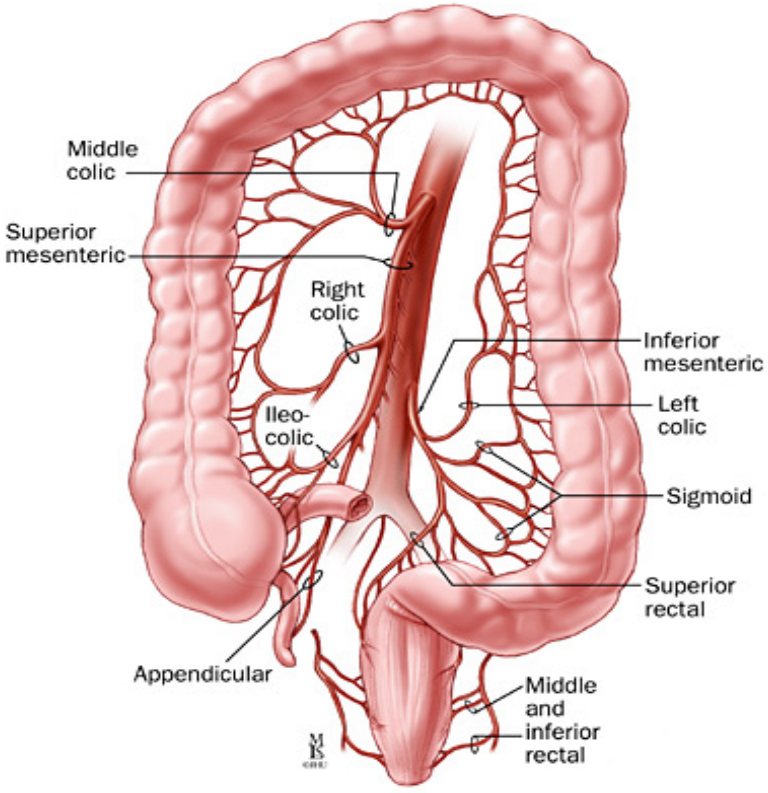
AVERAGE LENGTH AND DIAMETER OF THE SEGMENTS OF LARGE INTESTINE

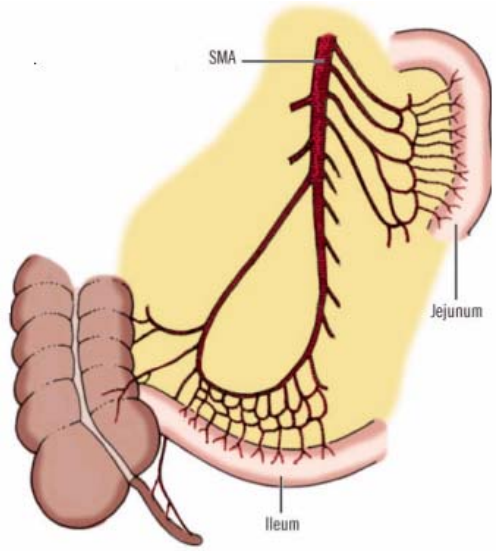
Fig - 1

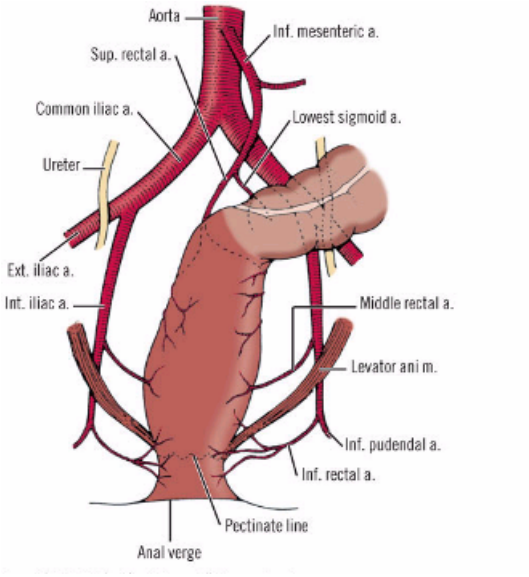


ARTERIAL SUPPLY OF THE LARGE AND SMALL INTESTINE, RECTUM & ANUS

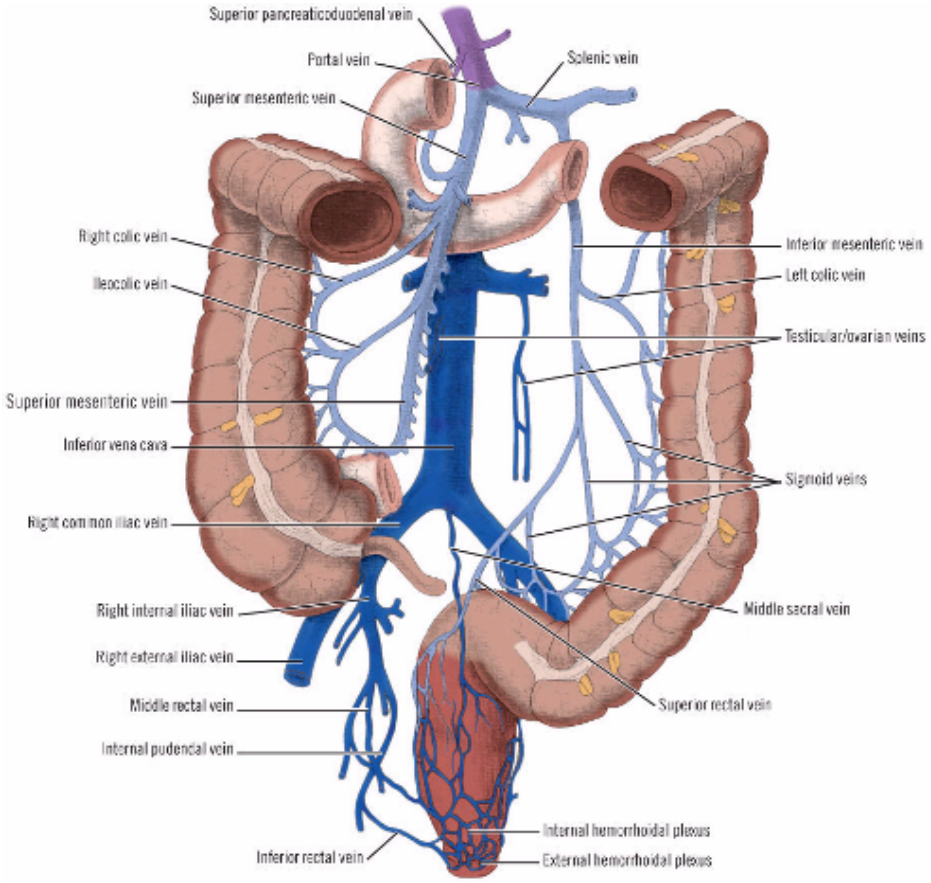
Fig - 2



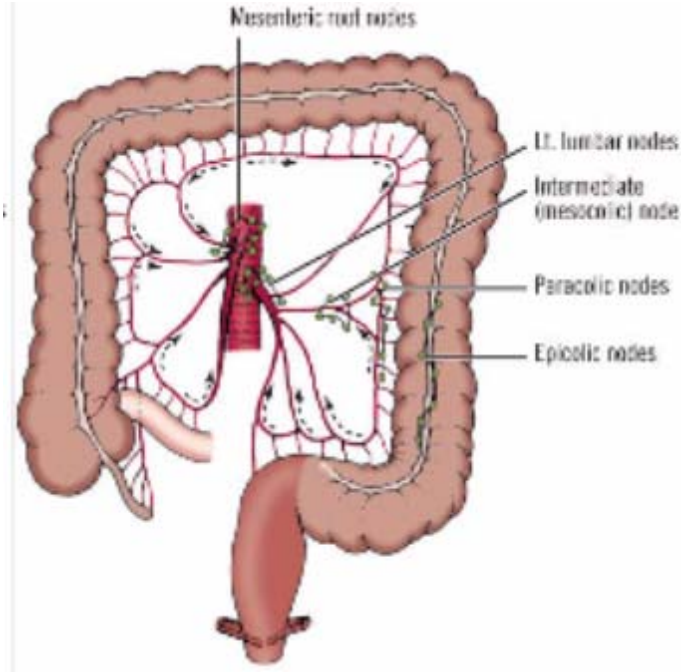




VENOUS DRAINAGE OF COLON AND RECTUM
Fig - 3



LYMPHATIC DRAINAGE OF COLON AND RECTUM
Fig - 4



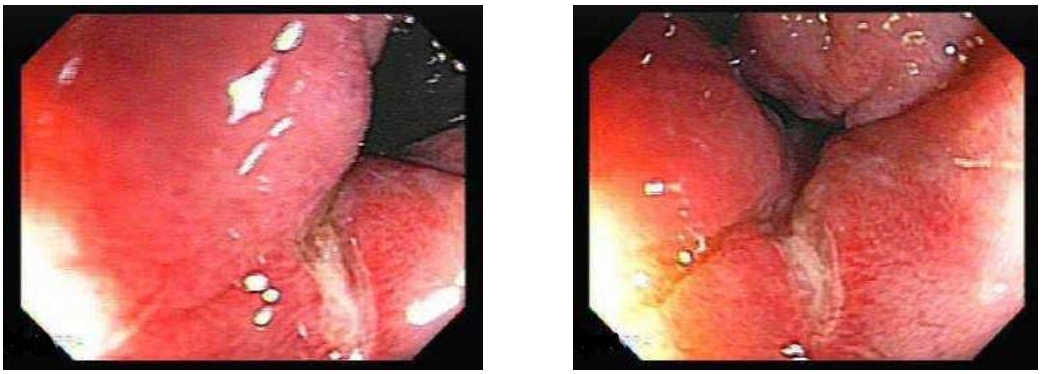
COLONOSCOPIC VIEW

INTERNAL HAEMORRHOIDS Fig -5

Left& middle: Internal haemorrhoids (Enlarged clusters of vascular tissues)

Right: III ^{O} Haemorrhoids

FISSURE IN ANO: MUCOSAL LEISIONS Fig - 6



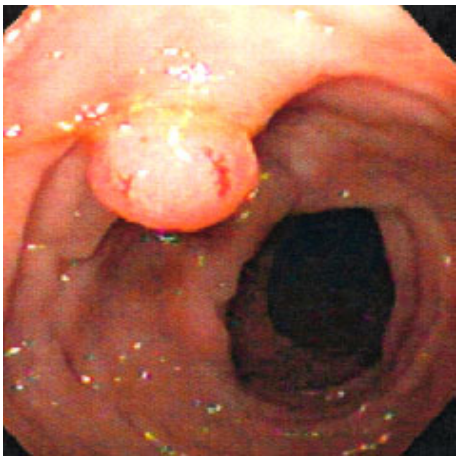
Left & Right: showing mucosal tear in Fissure in ano.

COLONOSCOPIC VIEW
AMOEBIC COLITIS
Fig - 7

Right – Rectal amoebiasis with two flask shaped ulcers.

Left – Multiple flask shaped ulcers.

RECTAL POLYP
Fig – 8



PROCTITIS
Fig - 9

Showing inflamed edematous
Rectal Mucosa

COLONOSCOPIC VIEW
COLORECTAL TUMORS
Fig – 10

Ulcerative growth rectum

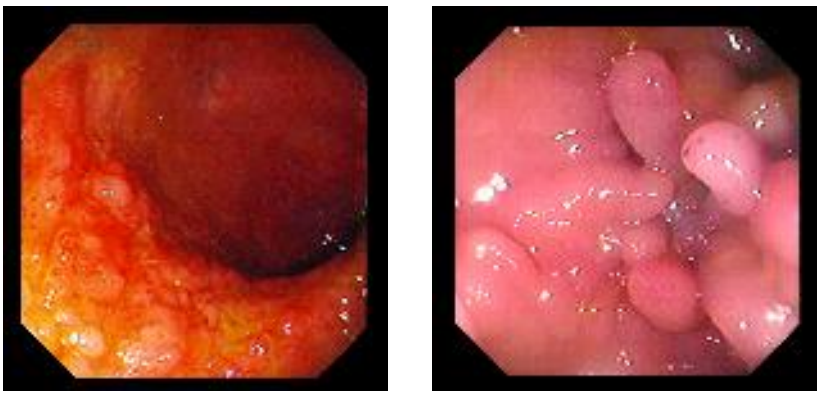
Constricting Adenocarcinoma
Sigmoid colon

Ulcero proliferative growth
Hepatic flexure

Ulcero proliferative growth
Rectal Adenocarcinoma

COLONOSCOPIC VIEW

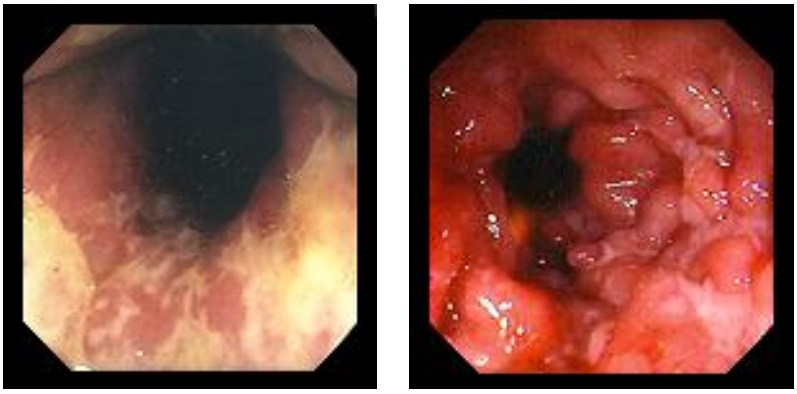
CROHN'S: MUCOSAL FEATURES
Fig -11



Left: Mucosal inflammation causes redness, friability (ease of bleeding) and edema (swelling), giving rise to a granular appearance

Right: Polypoid appearance (pseudopolyps),

ULCERATIVE COLITIS: MUCOSAL LESION
Fig -12

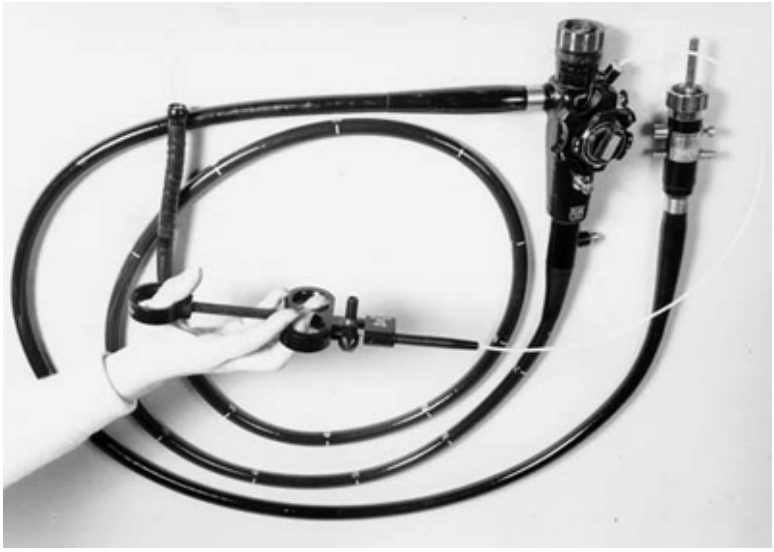


Left: Mucosal granularity, exudate and superficial ulceration. There is often an abrupt transition to relatively normal-appearing mucosa

Right: With increasing severity, ulcers may appear as punctuate

SIGMOIDOSCOPE
Fig - 13

COLONOSCOPE
Fig - 14



NORMAL COLONOSCOPIC VIEW
Fig- 15

	*Ano rectal junction, seen at retro flexion*		*Three semilunar folds, the "valves of Houston".*
	*Normal vascular pattern*		*Triangular folds characteristic of the transverse colon.*
	*Hepatic flexure showing the bluish indentation by the liver.*		*Caecum*
	*Opening of IC valve left; appendicular orifice right*		*Normal terminal ileum colonoscope through the ileocaecal valve.*

PROCTOSCOPE
Fig – 16

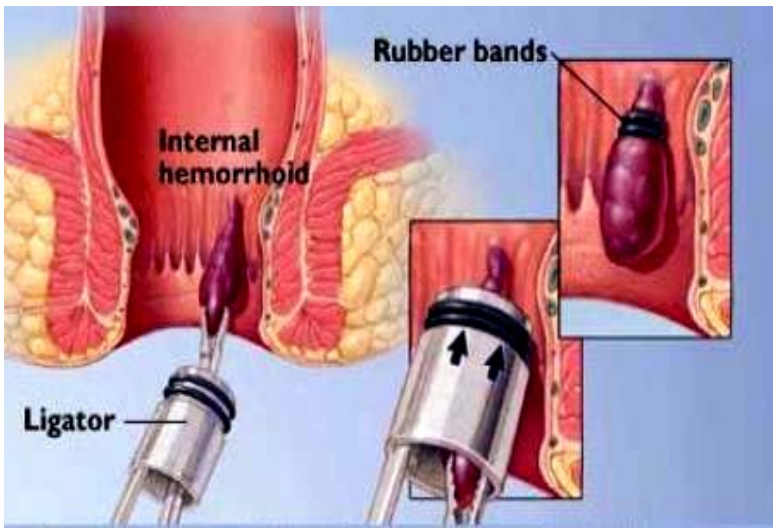
Fig – 17

Barium enema Skiagram of Mr. Srinivasan 60 / M IP No 12560 showing speculated serrated bowel margins (Ulcerative Colitis)

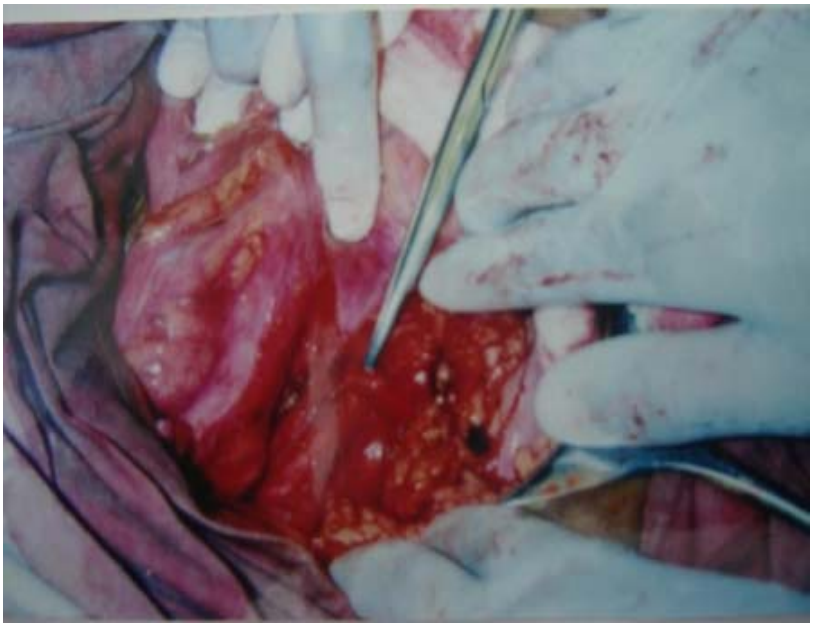
Fig - 18

BANDING FOR II ^{0} HAEMORRHOIDS

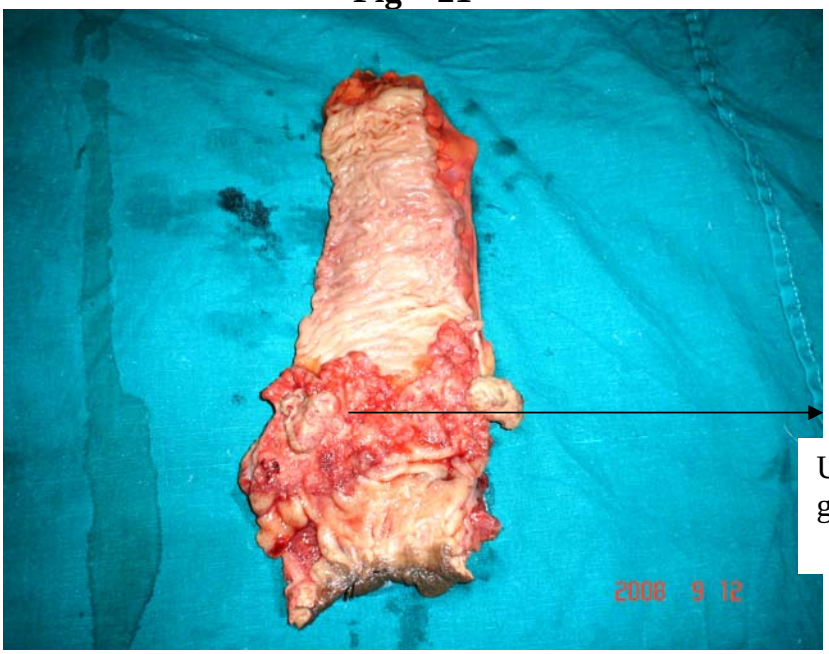
Fig - 19



ABDOMINOPERINEAL RESECTION
Mrs. Karpagam 45/F IP No 34990
Intraoperative Picture Showing Lt Ureter Crossing the Iliac Artery Bifurcation during APR
Fig – 20

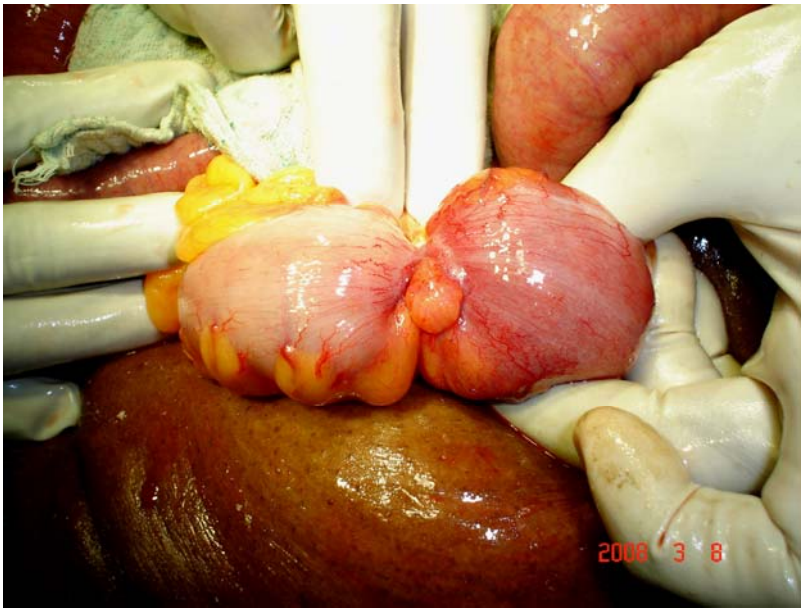


AP RESECTION SPECIMEN
Fig – 21

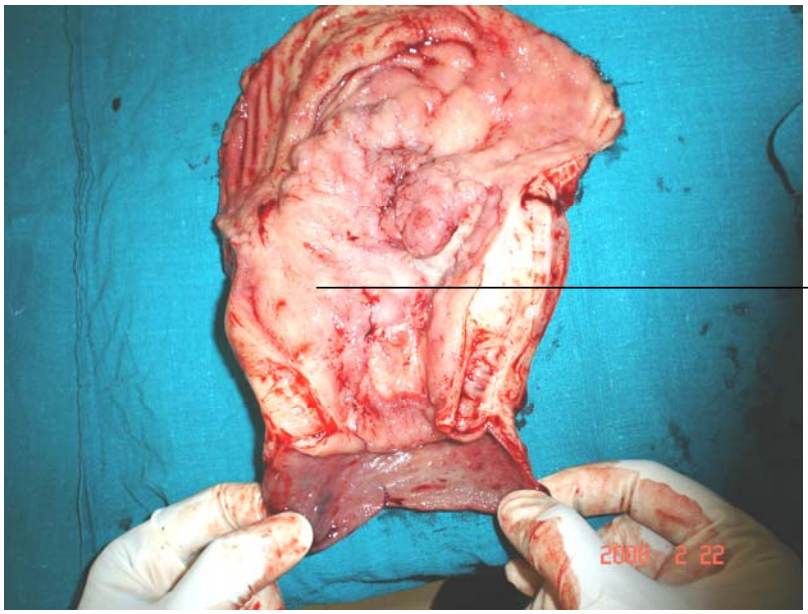


Ulceroproliferative growth Rectum

SIGMOID CARCINOMA WITH CONSTRICTION
Fig – 22
Mr. Marudhachalam 58/m IP No 46841



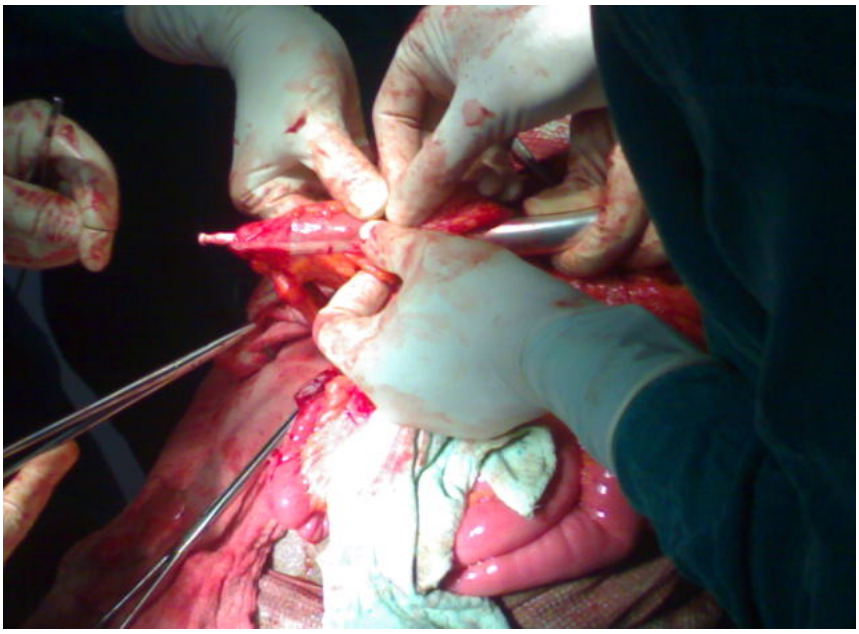
ANTERIOR RESECTION SPECIMEN
Fig – 23



Mr. Natarajan 65/M IP No 41368

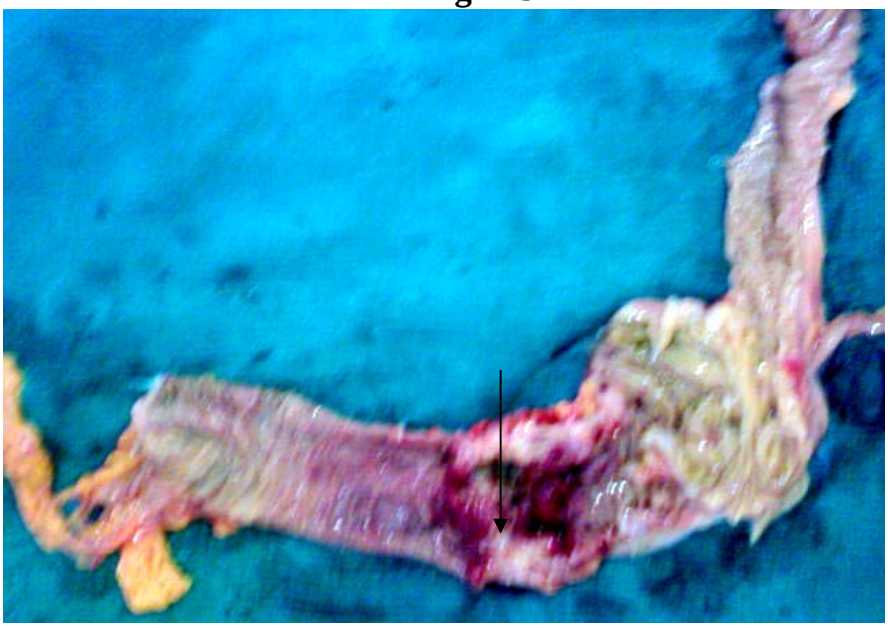
Intraoperative Picture Showing Ileotransverse Anastamosis Using Stapler during Extended Rt Hemicolectomy in hepaticflexure growth

Fig - 24



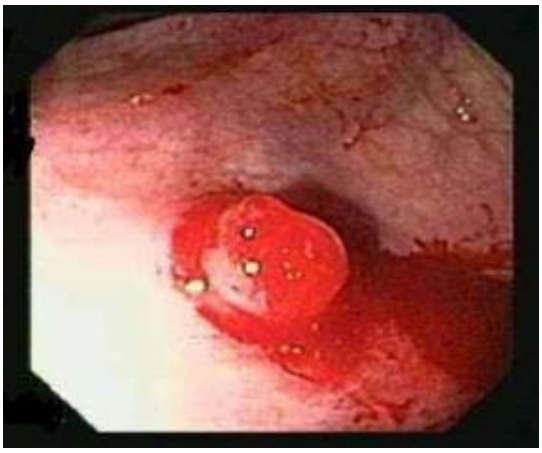
EXTENTZED RT HEMICOLECTOMY SPECIMEN

Fig - 25

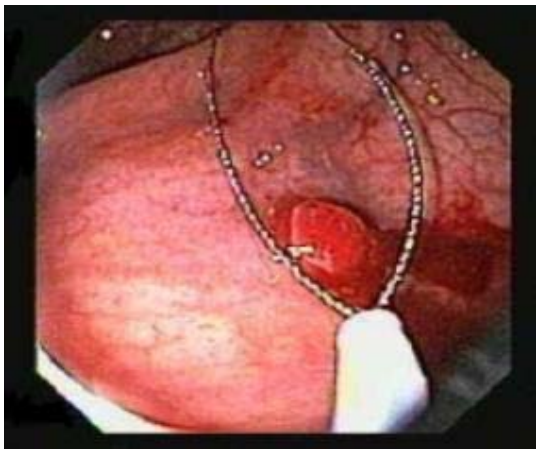


Ulcroproliferative growth at hepatic flexure

Fig 26
COLONOSCOPIC VIEW – POLYP & POLYPECTOMY



Showing bleeding rectal polyp



Polypectomy using snare loop